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CONDITION SURVEY, LIBERTY ARMY AIRFIELD
FT. STEWART, GEORGIA

by
R. J. Verner



May 1960

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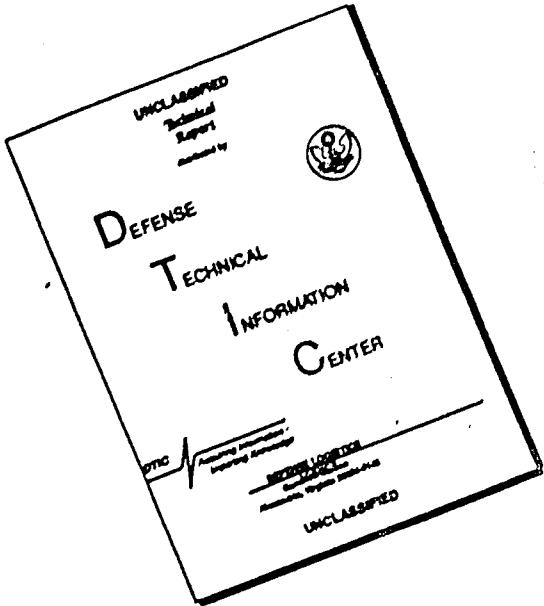
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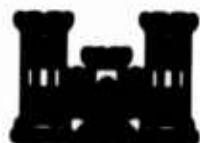
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MISCELLANEOUS PAPER 2402

**CONDITION SURVEY. LIBERTY ARMY AIRFIELD
FT. STEWART, GEORGIA**

by

P. J. Vodas



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Foreword

Authority for performance of condition surveys at selected airfields is contained in Instructions and Outline for Existing Pavement Condition Surveys, PT 1968, and is in accordance with the Long-Range Program, "Investigations and Studies Program for Development of Engineering Criteria, PT 1968, Army Funds," dated March 1967.

The inspection of the facilities at Liberty Army Airfield was requested by the Office, Chief of Engineers, and was made by Mr. P. J. Vedros of the Flexible Pavement Branch, U. S. Army Engineer Waterways Experiment Station (WES). This report was prepared by Mr. Vedros under the general supervision of Messrs. W. J. Turnbull, A. A. Maxwell, R. G. Ahlydin, and A. H. Joseph of the Soils Division, WES.

COL John E. Devalt, Jr., CH, was Director of the WES during the conduct of the study and the preparation of this report. Mr. J. B. Tiffey was Technical Director.

Contents

	<u>Page</u>
Foreword	iii
Conversion Factors, British to Metric Units of Measurement	vii
Purpose	1
Pertinent Background Data	1
General description of airfield	1
Previous reports	1
History of Airfield Pavements	2
Construction history	2
Traffic history	3
Condition of Pavement Surface	3
Summary	4
Tables 1 and 2	
Photographs 1-3	
Plate 1	

Conversion Factors, British to Metric Units of Measurement

British units of measurement used in this report can be converted to metric units as follows:

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
inches	2.54	centimeters
feet	0.3048	meters
miles	1.609344	kilometers
square inches	6.4516	square centimeters
pounds	0.45359237	kilograms
pounds per square inch	0.070307	kilograms per square centimeter

CONDITION SURVEY, LIBERTY ARMY AIRFIELD

FT. STEWART, GEORGIA

Purpose

1. The purpose of this report is to present the results of an inspection performed at Liberty Army Airfield (IAAF) in June 1977. The inspection was limited to visual observations, and no tests were conducted on the existing runways and taxiways. A layout of the airfield is shown in plate 1.

Historical Background Data

General description of airfield

2. IAAF is located on the reservation of Ft. Stewart approximately 40 miles* south of Savannah, Ga.

3. The airfield is located physiographically in the Atlantic Coastal Plains province. Natural soils in the immediate vicinity are of marine origin, consisting of relatively pervious silty and sandy clays.

4. In June 1967 the airfield consisted of four runways (runway 1 and 4 are considered temporary), connecting taxiways, one rigid pavement apron, two steel landing mat areas, and a surface treatment temporary apron for helicopters (plate 1).

Previous reports

5. Reports pertaining to the load-carrying capabilities of the pavements at IAAF that have previously been published are as follows:

- a. U. S. Army Engineer Division, Ohio River Division Laboratories, Cincinnati, Ohio, "Pavement Evaluation Report, Liberty Army Airfield, Fort Stewart, Georgia," dated July 1960.
- b. U. S. Army Engineer District, Savannah, Georgia, "Army Airfield Pavement Evaluation, Liberty Army Airfield, Fort Stewart, Georgia, and Appendix A, Studies Made for Evaluation," dated August 1972.

* A table of factors for converting British units of measurement to metric units is presented on page vii.

History of Airfield Pavements

Construction history

1. The construction at LAF was accomplished in four phases, with two phases of major reconstruction work. The layout and description of pavements at the time of this survey are shown in plate 1.

1. 1942-1943 construction. Facilities constructed during this period included runways 1 and 2, each 50 ft wide by 5000 ft long, and taxiways A, B, and C. These facilities were paved with 1-1/2 in. of asphaltic concrete over a 4-in. sand-tar base. The rigid pavements of apron A were of the thickened-edge type slab, with 9-6-6-9-in. section and a slab size of 12-1/2 by 25 ft. The apron taxiway was 6-in. portland cement concrete. A number of rigid pavement hardstands and connecting taxiways constructed at this time have since been abandoned, and are not shown on the airfield layout. Pavements were designed to support a gross aircraft load of 30,000 lb.
- b. 1944 construction. The east and west aprons consisted of steel landing mat, and were placed as extensions to apron A.
- c. 1954 reconstruction. In 1954, cracks were sealed and a bituminous seal coat containing aggregate of 3/8-in. maximum size was placed on the flexible pavements.
- d. 1962 construction. In 1962, runway 1 and taxiways A and C were overlaid with 4-1/2 in. of asphaltic concrete. Engine runup areas consisting of 2-in. asphaltic concrete over 8-in. stabilized base were constructed on taxiways A and C. Aircraft parking pads were constructed on the east steel landing mat with pads of 8-in. portland cement concrete pavement accessible by 2-in. asphaltic concrete overlay on surrounding steel mat. The 1962 pavements were designed for a single-wheel load of 22,000 lb with a tire pressure of 100 psi, except for the parking pads, which were designed for a 15,000-lb gear load on dual wheels spaced 20 in. c-c with a tire contact area of 100 sq in.
- e. 1966 construction and reconstruction. In the summer of 1966, runways 3 and 4 and the rotary wing apron were constructed. Construction was of a temporary type consisting of a 6-in. stabilized base course mixed in place using emulsified asphalt. The runways received an asphalt seal coat, and the apron received a triple bituminous surface seal. These pavements were intended for use only by the light Army aircraft of the "Bird Dog" type (gross weight of 2000 to 3000 lb). In the fall of 1966, runway 2 was overlaid with

a keystone course and a 1-1/2- to 1-3/4-in. asphaltic concrete surface course.

Traffic history

7. A detailed traffic record for IMAF is not available. It is stated in the report referenced in paragraph 5 that approximately 160 cycles of C-124 and C-130 aircraft traffic were applied on the strengthened runway (runway 1) during a five-day period in July 1962 without causing any apparent damage. At the time of this inspection, June 1967, there were approximately 11,000 cycles per month being applied (5500 cycles on each) on runways 1 and 2 by light Army type trainer aircraft. It is reported that some C-130 aircraft have operated on the field, but their gross weight was restricted to 106,000 lb.

Condition of Pavement Surface

8. In June 1967, the condition of the pavement surface ranged from excellent to fair. Surfaces of the pavement on runways 1 and 2 (photograph 1) and taxiways A (photograph 2) and C were in excellent condition. There were no visible signs of any types of cracking in the surface. The severe cracking that existed on the southwest end of runway 1 and that is described in the report referenced in paragraph 5b had not reflected through the 1962 overlay. The pavement surface on taxiway B was in fair condition. The surfaces of the two temporary runways (3 and 4) were in fairly good condition (photograph 3a) considering the low-quality pavement used. Some of the seal on runway 4 had peeled off (photograph 3b), and there were numerous areas where small clay balls had popped out of the mixed-in-place bituminous stabilized base course. The rigid apron pavement contained some corner breaks and numerous transverse breaks. The thin asphalt covering on the landing mat areas were cracked due to the movement of the underlying mat.

9. The pavement evaluation from the report referenced in paragraph 5b was updated for this report, and the pavement thicknesses and strength values shown in table 1 were obtained from that report. The overload evaluation is shown in table 2.

Summary

10. Conclusions based on the foregoing discussion and on observations made during the survey are as follows:

- a. The pavements are performing satisfactorily under the present aircraft usage.
- b. The use of a keystone course before placement of a thin asphaltic concrete surface course appears to help prevent reflection cracking from occurring.

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MAY 1974 VOL 40 / NO 5

Allowable Gross Wt of Aircraft for Basic Eval. Category II										
Facility	Overall Performance			Passenger			Substrate			Tire Wearlife
	Identification	Length in	Width in	Runway area in.	Break- away time sec	Breaking- strength psi	Flawed runway area in.	Strength time min	CBS or K	
Primary Parameters										
Rwy 1	3000	100	40-1/2	AC+	1-1/2	AC+	0	Stand, 100	20	100,000
Factory A	2100	90	40-1/2	AC+	1-1/2	AC+	0	Stand, 100	20	100,000
Factory C	2100	90	40-1/2	AC+	1-1/2	AC+	0	Stand, 100	20	100,000
Aerospace	300	30	0	PCC4	720	0	0	10,000	10	100,000
Aerospace A	300	30	0	PCC3	720	0	0	10,000	10	100,000
Aerospace B	300	30	0	PCC4	720	0	0	10,000	10	100,000
Aerospace Structural	20	20	0	Special Structures	0	0	0	SC1	0	100,000
Aerospace Inertial Sensors	200	200	2	AC+	0	0	0	Stand, 200	20	100,000
Factory A Group	2100	90	2	AC+	1	AC+	0	Stand, 100	20	100,000
Factory C Group	2100	90	2	AC+	1	AC+	0	Stand, 100	20	100,000
Secondary Parameters										
Rwy 2	3000	100	1-1/2	AC+	0	Stand, 100	0	10,000	10	100,000
Factory B	2100	90	1-1/2	AC+	0	Stand, 100	0	10,000	10	100,000
Rwy 3	2100	2100	0	0	0	0	0	10,000	10	100,000
Rwy 4	2100	2100	0	0	0	0	0	10,000	10	100,000
Rwy 5	2100	2100	0	0	0	0	0	10,000	10	100,000

Table 2

**SUMMARY OF PAVEMENT EVALUATION FOR OVERLOAD AIRCRAFT
ON PRIMARY PAVEMENTS LISTED IN TABLE I**
BASIC EVALUATION

Single wheels, 60,000-lb gross load
Twin wheels, 40,000¹-lb gross load

<u>Type Aircraft</u>	<u>Overload Aircraft</u>		<u>Allowable Gross Weight, lb</u>		
	<u>Empty Weight lb</u>	<u>Gross Weight lb</u>	<u>One Cycle per Month</u>	<u>One Cycle per Week</u>	<u>One Cycle per Day</u>
YAO-1	9,000	14,000			
H-21	9,000	15,000			
H-34	7,600	13,000			
AC-1	14,700	26,000			
H-37	20,700	31,000			
C-47	17,900	33,000			
C-123	30,000	69,000			
C-131	30,700	60,000			
C-119	41,000	77,000			
C-54	39,000	82,500			
C-130	57,300	135,000			
C-124	100,700	216,400			170,000

LEGEND



Aircraft can operate at maximum gross weight.

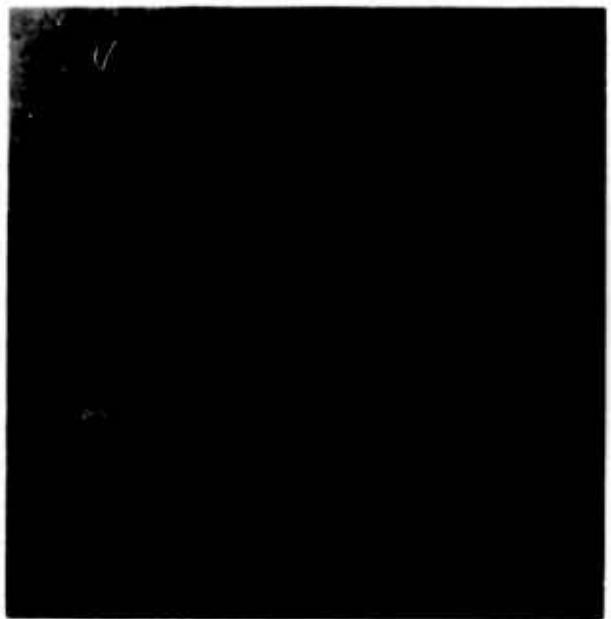


Aircraft can operate at load indicated.

WARNING: Runway length required for the safe operation of the overload aircraft has not been considered.



a. View along runway 2 looking toward northwest



b. Close-up of surface texture of pavement of runway 2

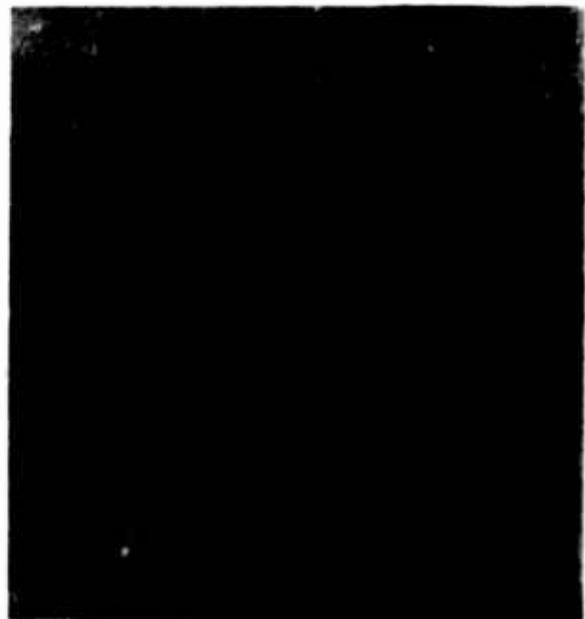
Photograph 1. Runway 2 in June 1967



Photograph 2. View along taxiway A
looking south in June 1967



a. General view



b. Close-up of peeling surface seal

Photograph 3. Runway 4 (considered a temporary facility) in June 1967

LANDING PLAN
LAWTON AIR FORCE BASE
OKLAHOMA

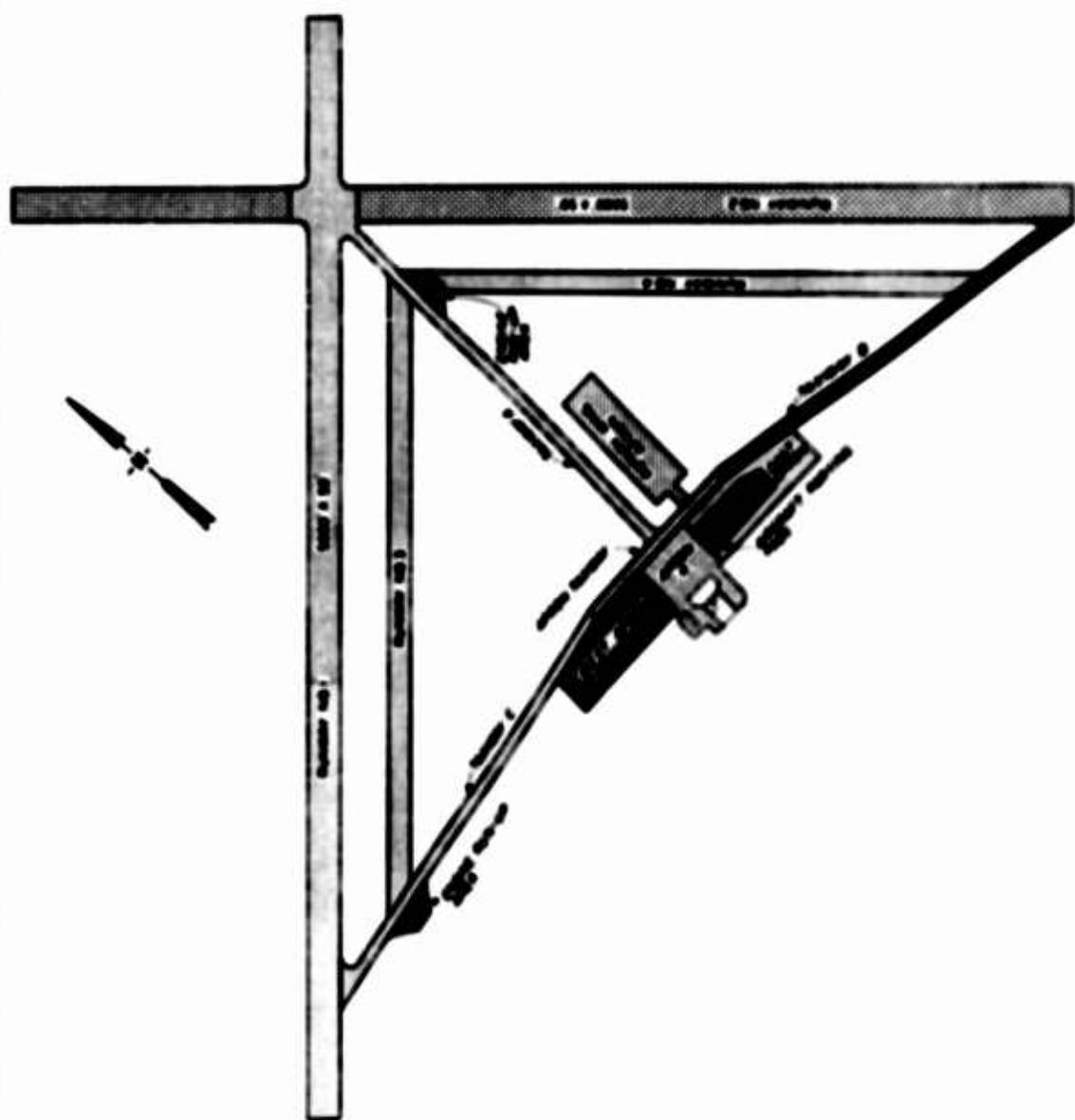


PLATE I